



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Handwritten signature/initials

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/638,401	08/12/2003	Hirofumi Kawai	241422US2	5469
22850	7590	03/16/2005		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER KENNEDY, JENNIFER M	
			ART UNIT 2812	PAPER NUMBER

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Supplemental Office Action Summary

Application No.

10/638,401

Applicant(s)

KAWAI, HIROFUMI

Examiner

Jennifer M. Kennedy

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-10 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) 7-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

In view of Applicant's amendment to the specification, the objection is withdrawn.

In view of Applicant's cancellation of the claims 11-16, the objections to the claims are rendered moot.

Drawings

The drawings were received on November 10, 2004. These drawings are acceptable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6, and 20-22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ryun et al. (U.S. Patent No. 5,484,737) in view of Seki (U.S. Patent No. 5,032,888).

Ryun et al. disclose a collector layer comprising a first kind of semiconductor material (31);

a base layer including a first base portion (Si of Si/SiGe or Si/SiGe/Si layer) and a second base portion (32, see column 4, lines 60-62), said first base portion coming in contact with the first collector layer and comprising the first kind of semiconductor material, said second base portion (SiGe of Si/SiGe or Si/SiGe/Si layer) coming in contact with the first base portion and comprising a second kind of semiconductor material; and

an emitter layer (34) coming in contact with the base layer and comprising the first kind of semiconductor material, said emitter layer forming a heterojunction with the base layer.

Ryun et al. but do not disclose the device wherein a film thickness of the first base portion is set such that, when a bipolar transistor having the base layer, the emitter layer, and the collector layer is in a non-saturated operation state, a depletion layer extending from a junction between the collector layer and the base layer does not reach the second base layer.

The examiner notes that Seki et al. discloses that base layer thickness is chosen so as to set the breakdown voltage of the device (see column 4, lines 15-28).

The examiner notes that Applicant does not teach that the base layer thickness solves any stated problem or is for any particular purpose other than that of preventing the lowering of the breakdown voltage. Thus, it would have been obvious to one of

Art Unit: 2812

ordinary skill in the art at the time the invention was made to have a film thickness of the first base portion be set such that, when a bipolar transistor having the base layer, the emitter layer, and the collector layer is in a non-saturated operation state, a depletion layer extending from a junction between the collector layer and the base layer does not reach the second base layer so as to set the breakdown voltage as Seki et al. teaches, and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233, MPEP 2144.05 II A.

The examiner notes that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In re claim 20, Ryun et al. discloses the device wherein an energy gap of the first kind of semiconductor material is larger than that of the second kind of semiconductor material (energy gap of silicon is 1.1 eV, energy gap of germanium is 0.67 eV, therefore the energy gap of the first kind (Si) is larger than that of the second kind (SiGe)).

In re claim 21, Ryun et al. discloses the device wherein a breakdown field of the first kind of semiconductor material is larger than that of the second kind of semiconductor material. (breakdown field of silicon is 30 V/ μ m, breakdown field of

germanium is 8 V/ μ m, therefore breakdown field of the first kind (Si) is larger than that of the second kind (SiGe)).

In re claim 22, Ryun et al. discloses the device wherein the first kind of semiconductor material is silicon, and the second kind of semiconductor material is silicon germanium (see column 4, lines 60-61).

Response to Arguments

Applicant's arguments filed November 10, 2004 have been fully considered but they are not persuasive.

Applicant's argue that Seki does not disclose a BiCMOS. In response to applicant's arguments, the recitation of "a BiCMOS device operated with an RF signal" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Further, Applicant's argue that the device of Seki is much different from that of the claimed device. Applicant notes that the thickness of the base layer of an IGBT is different from that of a BiCMOS. Again, it is noted that in independent claim 6, no

Art Unit: 2812

patentable weight has been given to the limitations of a BiCMOS. The examiner notes that a BiCMOS is simply defined as a bipolar transistor and MOS transistors on the same chip and that no specific thicknesses of the base layer are associated with a BiCMOS. Further, it is noted that no specific thickness of layers are claimed, other than that relative to the depletion layer. The examiner notes that the device of Seki is an IGBT, which is a bipolar transistor. Seki is combined with Ryun et al., a bipolar transistor. Seki is only relied upon to show that the base layer's thickness is determined to set the breakdown voltage of the device (see column 4, lines 15-28). Determination of the base layer's thickness based on the breakdown voltage of the device is a concept applicable to all bipolar transistors.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of


Art Unit: 2812

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk